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Preoperative Anxiety in Preschool Children – Observational Study

Artigo de Investigação Médica

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LISTA DE ACRÓNIMOS E ABREVIATURAS

APPO – Ansiedade Pediátrica Pré-Operatória

ASA - American Society of Anesthesiologists physical status

CHP – Centro Hospitalar do Porto

CICA - Centro Integrado de Cirurgia Ambulatória

ENT – Ears Nose and Throat

mYPAS-SF – modified Yale Preoperative ANxiety Scale – Short Version

OR – Operation Room

ORL – Otorrinolaringologia

PPIA – Parental Presence during Induction of Anesthesia

PPOA – Pediatric PreOperative Anxiety

T1 – Time 1 / Tempo 1

T2 – Time 2 / Tempo 2

ABSTRACT

Background: Pediatric preoperative anxiety (PPOA) has been a concerning matter of interest for the past decades with a high reported prevalence. Adverse outcomes arising from this stressful experience branch into social, developmental, behavioral and both intra and postoperative fields. The management of anxious and fearful children is a priority for minimizing PPOA are of the upmost importance.

Objectives: The aim of the study is to assess the levels of preoperative anxiety and their relation to a group of selected variables in a pediatric population being submitted to ambulatory surgery under general surgery.

Methods: Children's anxiety was assessed using the modified Yale Preoperative Anxiety Scale – Short Version (mYPAS-SF) at the preoperative holding area (Time 1) and at the operation room during induction of anesthesia (Time 2). A cutoff value of 30 was used to differentiate anxious children from non-anxious children (scores ≤30). Additional data as age, sex, ASA physical status and type of surgery was collected by accessing the children's clinical files.

Results: Within a total of 67 children, we observed 9 (13.4%) anxious children at T1 and 24 (35.8%) children at T2. A difference between sexes was not present (p=0.634 for T1 and p=0.303 for T2), but the boys group presented higher scores on both times and tends to have a significant increase in its scores from T1 to T2 (p=0.049). A change in the anxiety status from T1 to T2 does not tend to occur (p=0.01). However, if such change occurs it will be in the way of converting to an anxious status. Younger children (<4years) tend to have higher scores although a statistical significance was not found between the defined age groups. No statistical significant difference was found between the remaining variables.

Conclusions: The number of anxious children presented is lower than the estimated worldwide and reveals both the result of correct practices and best use of resources. However, the scarcity of studies exploring this topic on a national level renders an indication for a future path to implement similar studies, with larger samples and further studying of the potential predisposing and contributing variables. The never-ending purpose should be to institute more customized programs for minimizing PPOA by means of multimodal combinations of anxiolytic practices.

Keywords: Anxiety - Children - Pediatric anesthesia - Preoperative care - modified Yale Preoperative Scale – Short Form - Surgery

ORIGINAL ARTICLE

Introduction

Pediatric preoperative anxiety (PPOA) has been an increasing matter of interest for the past decades.(1). With PPOA being a common phenomenon, up to 60% of children receiving surgery with general anesthetic are anxious prior to the surgery in the holding area and during the induction (Kain et al. 1996a). These subjective feelings of tension, apprehension and nervousness (2) can be either verbalized or become noticeable by behavioral changes with an amplified autonomic nervous system activity. The consequences of high anxiety levels present nowadays as a double problem in modern healthcare, concerning both the child's well-being and the medical facility's logistics(3) and its management is crucial for achieving optimal treatment outcomes(4). It is commonly believed that increased anxiety in the preoperative setting can be translated into augmented intraoperative anesthetic requirements (4) as well as an array of post-operative complications. Adverse outcomes include more pain after the procedure with increased analgesic consumption, prolonged recovery time and hospital stay, greater incidence of negative behavioral changes such as separation anxiety, reemerging enuresis, sleep disorders and eating problems(2, 4-8). Indiscipline and lack of cooperation were described as the main behavioral problems recurring from preoperative anxiety states and high levels of preoperative anxiety are associated with increased incidence of emergence delirium (9). The perioperative period is particularly important in this scenario because it is very difficult to manage an anxious and fearful child posted for surgery.

It is of the upmost importance that the antianxiety measures should start immediately after admission to avoid such a scenario and the anesthesiologists have a crucial role in it (1).

The Scale

Several scales have been developed to measure PPOA and have been used for both clinical and research purposes.

The Yale Preoperative Anxiety Scale, which was used in over 100 studies across diverse health fields, was first developed in 1995(10). Later, was revised to create the Modified Yale Preoperative Anxiety Scale (11) and enhanced for over a decade until the Modified Yale Preoperative Anxiety Scale – Short Form (mYPAS-SF) appeared in 2014 (12). This observational scale comprises 4 domains - the children's activities, vocalizations, expression of

emotions and state of apparent arousal - with Likert-type response options. Children's behavior can be rated from 1 to 4 or 1 to 6 (depending on the domain) and a higher rating corresponds with a higher severity for that domain (Appendix 1).

This particular updated version of the observational scale (mYPAS-SF) still bears the advantage of being valid for younger children – from the age of 2 – and it's more easily applied and completed in a shorter period of time since it has 2 times of assessment (in the preoperative holding area and when the anesthesia mask is introduced to the children), therefore being adapted to busy preoperative clinical research settings (12). The mYPAS-SF has strong validity and reliability (12).

Study Purpose and Hospital Framework

The purpose of this observational study is to evaluate the anxiety levels of a determined population of children being submitted to ambulatory surgery under general anesthesia. The study was conducted for 8 weeks in the Centro Integrado de Cirurgia de Ambulatório (CICA) - a center of ambulatory surgery that integrates the Centro Hospital do Porto (CHP), a tertiary, central and teaching hospital located in Porto, Portugal. CICA reserves one day per week (Tuesday) for pediatric ambulatory surgery (children till the age of 18) with only pediatric patients and pediatric-trained healthcare professionals.

No other study has ever assessed the question of PPOA in a Portuguese hospital setting; it is of particular interest to evaluate the implemented procedures of a district public hospital with an entire day per week dedicated to pediatric ambulatory surgery. The data obtained from this observational study can enlighten the standard of care and help stablishing further improvements of the management of PPOA in preschooler age.

Methods

Study Design and Criteria

After the ethics committee approval the transversal observational study was conducted. . The study lasted for 8 weeks, comprising 7 different days of data collecting. The mYPAS-SF was applied to each child in the preoperative holding area (T1) and when the anesthesia mask is introduced to the children (T2). The children clinical file was accessed in order to obtain the additional information: date of birth, age, gender, American Society of Anesthesiologists physical status (ASA) and type of scheduled surgery. The inclusion criteria were the following: children aged between 2 and 6 years old that hadn't started primary school yet; children being submitted to scheduled outpatient surgery on CICA's second floor surgical ward; children with ASA physical status I and II and children that attended an anesthetic consultation prior to the surgery. The exclusion criteria were the following: use of psychoactive medication; neuromotor impairment; decompensated illness; history of previous surgery and being accompanied by a non-family member. This approach allowed for a randomized sample. Pre-anesthetic medication was not given to any subject of the present study.

Scale use, Scoring and Cutoff Values

The mYPAS-SF was applied in two distinct times, proposed when the scale was transformed into a short version (12). The first (T1) was in the holding area were the children were accompanied by their family members, already dressed for the operation room, along with the other children planned for surgery on that specific day. The other moment (T2) was in the OR when the anesthesia mask was introduced to the child, with the family member still present in the room.

The only observer was the main author of the present study dressed as the remaining healthcare professionals (doctors and nurses). Direct personal contact between the observer and both the parents and children was not established at any time. Before the actual study, a pilot tryout was elaborated for training purposes to master the use of the scale.

The total score of the scale was calculated as suggested by the authors that revised the scale (12). For each domain the patient's partial score was divided by the maximum score obtainable in that domain (6 for the vocalizations domain and 4 for the remaining). The produced values for each domain are all added up, divided by 4 and multiplied by 100. A score ranging from 22.92 to 100

was obtained with higher values, representing higher states of anxiety. The domains and scores of the scale are presented below.

Domains	Activity	Vocalization	Emotional Expression	State of Apparent Arousal
Nº of categories	4	6	4	4
Category		**Scores**		
1	0.25	0.17	0.25	0.25
2	0.50	0.33	0.50	0.50
3	0.75	0.50	0.75	0.75
4	1.00	0.67	1.00	1.00
5		0.83		
6		1.00		

Total Score = sum of the score of the 4 domains multiplied by 25

Table I - Domains and scores of the modified Yale Preoperative Anxiety Scale – Short Form

The original cutoff value of 30 (11) was used for the mYPAS-SF as advised by Brooke N. Jenkins(12), upon e-mail communication. Thus, for study purposes, children with scores superior to 30 were considered as having anxiety and children with scores from 22,92 to 30 were considered as not having experienced significant anxiety.

Hospital Materials and Staff

It is important to mention that the days when the data was collected were reserved for pediatric surgery only, with a trained healthcare staff (nurses, anesthesiologists, surgeons) with pediatric experience. On the holding area, a variety of toys were provided for children to play with, along with coloring books. Children were allowed to bring their electronic devices to play videogames or watch cartoons/series. There is also a retired kindergarten teacher that volunteers as a monitor to play and entertain the children.

Statistical Approach

The results were presented in the form of descriptive tables and $p<0.05$ were considered significant. The statistical analysis was conducted by stages. First some groups were created for further analysis. Children were divided by age <4years or ≥4years, forming the Age Group 1 and 2 respectively. The surgical procedures were also divided by Ears /Nose and Throat (ENT) procedures and non-ENT procedures. The sex variable was divided by male/female and ASA status in 1 and 2.

A descriptive analysis was made using median, mean and standard deviation segregating for each variable - age, sex, surgery, ASA physical status and mYPAS-SF scores. When appropriate, the Mann-Whitney or T-Student's test were applied to study continuous variables, while the X^2 and Fisher's exact test was used for categorical variables analysis.. Finally, the McNemar and Kappa agreement tests were used to analyze distribution of anxious and non-anxious children at time 1 and time 2.

Results

Descriptive

A total of 67 children undergoing general anesthesia for elective outpatient surgery met the inclusion study criteria, with no missing cases. The mYPAS-SF was applied to our sample. The mean age of the 42 (62.7%) boys and 25 (37.3%) girls was 4.2 ± 1.2 years with 30 (44.8%) children younger than 4 years. The population comprised 56 (83.6%) children being classified as ASA 1 and the remaining 11 (16.4%) being ASA 2. The distribution by surgical field comprised 35 (52.2%) ENT related procedures.

Table II shows the number of children per category on each of the 4 domains of the scale, both on the holding area (T1) as at the operation room (T2):

	Activity		***Vocalization***		***Emotional Expression***		***State of apparent arousal***	
Category	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
1	61	51	58	42	55	39	62	53
2	5	10	6	13	10	21	5	10
3	0	3	3	8	2	4	-	1
4	1	3	-	1	-	3	-	3
5			-	1				
6			-	2				

Table II - Number of patients per category on each domain of the mYPAS-SF scale at the Holding Area (Time 1) and at the Operation Room (Time 2)

mYPAS-SF Scores Analysis

The median, percentile (25^{Th}-75^{th}), mean and standard deviation values of the mYPAS-SF scores at the holding area (Time 1), at the OR when the child was introduced to the anesthesia mask (Time 2) and the difference between these two moments, are presented in Table III. The maximum score (100,00) was observed only at Time 2, by two boys that presented a physiologic response with enuresis, during the induction of the general anesthesia at the operation room (T2).

	Time 1	Time 2	Time 2 – Time 1
Median (25Th-75th)	22.9 (22.9 - 27.1)	22.9 (22.9 - 35.4)	
Mean ± SD	26.2 ± 7.2	33.6 ± 17.9	7.4 ± 14.7
Sex			
Boys	25.7 ± 6.4	35.2 ± 19.1	9.5 ± 16.4
Girls	26.9 ± 8.5	30.9 ± 15.9	4.0 ± 10.6
ASA Physical Status			
1	26.3 ± 7.5	32.5 ± 17.0	6.2 ± 12.4
2	25.8 ± 6.3	39.4 ± 22.1	13.6 ± 23.0
Age (years)			
<4	25.6 ± 6.3	36.2 ± 17.5	10.6 ± 13.9
+4	26.6 ± 7.9	31.5 ± 18.2	4.9 ± 15.0
Surgery			
ENT	25.1 ± 6.1	33.9 ± 19.9	8.9 ± 17.4
Other	27.4 ± 8.2	33.3 ± 15.9	5.9 ± 11.0

Table III - Median, percentile (25Th-75th), mean and standard deviation scores of the mYPAS-SF at Holding Area (Time 1) and at the operation room when the child is introduced to the mask (Time 2).

Using the established cutoff of 30 in the mYPAS-SF, there were 6 children fulfilling the anxious criteria at Time 1 and 24 children at Time 2, corresponding to a prevalence of anxious children of 13.4% for T1 and 35.8% for T2. Distribution of number, percentage and statistical p-value concerning the anxious children, at both of the times, is displayed at Table IV, for the variables previously mentioned.

	Anxious (Score>30)						Total
	Time 1			Time 2			
	N	%	P	N	%	p	
Sex			0.634			0.303	
Male	5	11.9		17	40.5		42
Female	4	16.0		7	25		25
Age (years)			0.458			0.95	
<4	3	10.0		14	46.7		30
+4	6	16.2		10	27.0		37
ASA			0.644			0.157	
1	8	14.3		18	32.1		56
2	1	9.1		6	54.5		11
Surgery			0.053			0.196	
ENT	2	5.7		10	26.8		35
Non-ENT	7	2..9		14	43.8		32

Table IV- Distribution of anxious children (mYPAS-SF score >30) at Times 1 and 2, discriminated for age group, sex, ASA physical status and field of surgery.

Although a statistical significant difference between the number of anxious boys and girls was not present (p=0.634 for Time 1 and p=0.303 for Time 2), there was a statistical significant difference, using the Mann-Whitney test (p=0.049) demonstrating that the boys group tends to have an increase in anxiety from Time 1 to Time 2, in comparison to the girls.

No statistical significant difference was found between the anxiety status or the scale scores related to the variables ASA physical status (p=0.664 and p=0.157) or the different subset of surgical procedures (p=0.053 and p=0.196).

Finally, the distribution of anxious/non-anxious children at Time 1 and Time 2 is described by Table V. Once again, children were considered anxious when scores superior to 30 were registered.

		Time 2 - Anxious		**Total**
		No	**Yes**	
Time 1- Anxious	**No**	40	18	58
	Yes	3	6	9
Total	**Count**	43	24	67

Table V - Distribution of anxious/non-anxious children at Time 1 and Time 2

Upon applying of the described cutoff at T1 and T2, a total of 46 (68.7%) children maintained their status (anxious/non-anxious) from T1 to T2 and this finding is not driven by randomness (McNemar p=0.01). Conversely, a total of 21 (31.3%) children changed their status with a proportion of 18 (26.9%) going from non-anxious to anxious. The Kappa agreement value found was 0.209 with a p=0.038.

Discussion

On a first basis observation, it is of relevance to comment the sample composition. The difference between the number of boys (62.7%) and girls found on the randomized sample of the present study goes accordingly to the CHP patterns of distribution by sex (68.7% boys), upon request of the distribution of the 2 to 6 years old children submitted to general anesthesia, for scheduled ambulatory surgical procedure during the 8-week temporal frameshift of the study. Boys showed a higher percentage of the CHP admitted children and clarifying this potential bias.

General findings

Since worldwide levels as high as 60% of PPOA are reported (2), it would be of interest to compare the prevalence of anxious children found (13.4% for T1 and 35.8% for T2) with similar ones encountered at Portuguese national hospitals but no comparable data was available until the moment of this study. Therefore, it becomes relevant to discuss what would be expected bearing in mind the hospital conditions and healthcare staff qualifications. As mentioned before, children admitted to CICA contact with specialized pediatric nurses and doctors, benefit from the volunteer work of the monitor and have a myriad of equipment such as toys and coloring books or the option to bring the children's own electronics - offering the chance of playing videogames or watching videos/cartoons – all of what was showed, in previous studies, to help relief and diminish anxiety levels in children preoperative period. (13-22) The contact with the stated material, occurs mostly during the holding area (T1) since not many children were carrying any of these equipment to the operation room. This observation may surface as an additional explanation to the prevalence observed in the operation room along with the already proved tendency for children to have and overall increase in anxiety once they enter the OR (3, 23, 24).

Variables interplay

Concerning sex differences, the boys group presented higher scores on both times, in comparison to the girls group. Findings in the present study demonstrate that the boys tend to have higher scores, corresponding to more anxious states, even though the number of anxious boys above the defined cutoff may not be significantly diverse from the number of anxious girls. In the past, studies have identified being male as a risk factor for a more anxious response (25), while more recent ones stated that sex was not found to be a factor capable of causing this distinction (23, 26). Hence, the need for additional studies with larger sample sizes is enforced for an enlightening of this topic.

From observing and studying the distribution of anxious/non-anxious children at Time 1 and Time 2, it is possible to infer that a change in the anxiety status from T1 to T2 does not tend to occur in most of the children. However, if such change actually occurs, it will most likely be in the way of converting from a non-anxious status into an anxious one. The described finding correlates with the previous described tendency of increasing anxiety levels at T2 (3, 5, 23, 24).

Regarding the age groups, a tendency for the younger group of children (<4years) to have higher scores was observed, although a statistical significance was not found between the delineated age groups. This corresponds with the findings from previous literature, seeing that younger ages have been associated with more anxious states (23, 27-29)

Conclusions

A main acknowledgement that requires distinction is the scarcity of studies exploring the level of pediatric preoperative anxiety (PPOA) levels on a national basis. A crescendo of interest in this particular area should be fomented in practitioners, especially in healthcare facilities with dedicated units and programs of pediatric surgery. The development of new scales and revision of the existing tools for measuring anxiety levels provides the solid ground needed to disclosure more detailed approaches when facing anxious children being submitted to general anesthesia and minimizing children's stress.

Once observed the anxiety prevalence in the children comprised by the present study, revision of the methodology and guidelines applied in this specific hospital setting might be of interest. The number of anxious children presented is lower than the estimated worldwide and reveals the benefits of merging correct practices and best use of all the resources available (toys, electronics, assistance). However, it can possibly suffer a downgrading by identifying children with intrinsic anxious traits that are more prone to suffer from anxiety in this setting and provide them pre-anesthetic sedation (3, 15). This measure is not stripped of negative effects but it has been proved to be of value in selected cases like the aforementioned (30, 31). Purposing children's distraction, activities more developmentally appropriate and contextualized such as storytelling and coloring were recently found to be an efficient alternative to traditional pharmacological premedication for children undergoing day surgery by a randomized controlled non-inferiority trial and present as valid option(22). It might be of special concern to encourage these activities since there are already personnel volunteering for this specific task.

In addition, a complementary set of intervention, especially with psychological accompaniment was recently discovered to render children less anxious and more cooperative in the preoperative period and during the induction (32) as well as behavioral programs, despite showing mixed results and typically having higher costs associated (3, 33-35). Parental presence during induction of anesthesia (PPIA) has been greatly discussed lately since the parents state of anxiety influences the child's state too (3, 30, 31, 36). The presence of parents in the OR has showed to reduced their level of anxiety and improved the overall satisfaction (31) however only calm parents seem to retain a benefic anxiolytic effect on an anxious children (37)

Given the context specified along the reported study, an indication for a future path would be to implement similar studies along the national hospitals, with larger samples and studying of the weight of potential variables in predisposing and contributing to PPOA . Particular attention should be given in incorporating the family in the process to ensure a cohesive and synergic acting with the healthcare team – that plays an essential and everlasting role – in promoting a positive perioperative experience. Comprehensive psychological evaluation for children remains as a mainstay for further elucidation of the topic (38) along with parallel development of increasingly tailored programs for lessening children's stress in preoperative settings by instituting multimodal combinations of PPIA, anxiolytic medications, behavioral interventional programs(34, 35), preoperative information programs(39-41) and distraction and play activities.

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RESUMO CIRCUNSTANCIADO

Introdução

A ansiedade pediátrica peri operatória (APPO) tem-se revelado como um tema de interesse crescente nas últimas décadas, com uma prevalência de cerca de 60% nas crianças submetidas a anestesia geral com intuito cirúrgico. As consequências decorrentes de altos níveis de ansiedade motivam, no panorama vigente, uma problemática dupla na prestação moderna de cuidados de saúde: a preocupação com o bem-estar da criança e a capacidade logística e organizacional da instituição de saúde. Assim, a gestão e respetiva conjugação destes dois tópicos são cruciais para a concretização de desfechos ótimos, sendo que, atualmente, são parte integrante do conhecimento na área a relação entre o aumento da ansiedade neste contexto e o incremento dos cuidados anestésicos intra-operatórios, bem como uma miríade de complicações pós-operatórias decorrentes desta situação de stress.
Estes sentimentos subjetivos de tensão, apreensão e nervosismo podem verbalizar-se ou tornar-se evidentes por mudanças comportamentais. Entre os corolários adversos, relevam-se vários efeitos: aumento do consumo anestésico e da dor pós-operatória, prolongamento do internamento e da recuperação, maior incidência de alterações comportamentais adversas como ansiedade de separação, enurese reemergente, perturbações do sono e alimentares, indisciplina, ausência de cooperação e ainda uma incidência aumentada de delírio emergente. O período temporal peri operatório reveste-se de particular importância no cenário explanado pela ardilosa tarefa de gerenciar crianças ansiosas e receosas, com os anestesistas a desempenhar um papel capital neste processo.

A escala

Para cumprimento de propósitos clínicos e de investigação, um conjunto de ferramentas foi elaborado que permite a medição da APPO, com especial destaque para a *Yale Preoperative Anxiety Scale* desenvolvida em 1995 e utilizada em mais de 100 estudos, em variados campos da saúde. Sucessivas revisões, acopladas a modificações, possibilitaram a criação *da Modified Yale Preoperative Anxiety Scale – Short Form* (mYPAS-SF) em 2014, atualmente a versão mais recente da escala. Esta escala observacional engloba 4 domínios – Atividade, Vocalização, Expressão Emocional, Estado de Aparente Despertar – com opções de resposta *Likert-type*. O comportamento da criança pode assim ser pontuado de 1 a 4 ou 1 a 6 (conforme o domínio em avaliação) sendo que pontuações mais altas correspondem a estados de maior ansiedade e gravidade para o domínio em observação (Anexo 1).

Esta versão mais recente da escala possui a vantagem de permanecer aplicável a crianças mais jovens – a partir dos 2 anos de idade – e requer apenas dois momentos de observação: um primeiro tempo que antecede a entrada na sala do bloco operatório na enfermaria; e um segundo tempo, na sala do bloco operatório, quando a máscara anestésica é apresentada à criança. A mYPAS-SF mantém a forte validade e a confiabilidade das versões predecessoras com a vantagem de ser completada num intervalo de tempo mais curto, o que a torna adaptada ao contexto de difícil flexibilidade temporal inerente ao funcionamento do bloco operatório.

Objetivos e Enquadramento Hospitalar

O propósito do estudo cativa-se na avaliação dos níveis de ansiedade de uma população de crianças em idade pré-escolar submetidas a cirurgia em regime de ambulatório, sob anestesia geral. O estudo foi conduzido durante 8 semanas no Centro Integrado de Cirurgia de Ambulatório (CICA) do CHP – um hospital universitário, terciário e central que integra o Centro Hospitalar do Porto.

Nenhum outro estudo avaliou a questão da APPO num contexto hospitalar nacional, o que fomenta o interesse na avaliação das práticas implementadas num hospital distrital com uma agenda e logísticas tão dedicadas à cirurgia pediátrica de ambulatório. A informação obtida por este estudo observacional propõe, deste modo, esclarecer a realidade da APPO e potencialmente providenciar indicações de coadjuvação futura na gestão deste tema.

Materiais e Métodos

Desenho do Estudo e Critérios

O estudo observacional transversal foi iniciado após aprovação da comissão de ética do CHP, com a duração de 8 semanas que corresponderam a 7 dias diferentes de colheita de dados. A mYPAS-SF foi aplicada a todas as crianças em dois momentos temporais, na enfermaria do piso 2 do CICA, tendo sido o processo clínico das crianças consultado para obtenção de informação adicional: data de nascimento, idade, sexo, *American Society of Anesthesiologists physical status* (ASA) e tipo de cirurgia realizada. Foram considerados critérios de inclusão: idades compreendidas entre os 2 e 6 anos, que não tivessem iniciado o ensino primário, cirurgias eletivas, ASA *status* 1 ou 2 e com consulta anestésica prévia. Como critérios de exclusão enumeram-se: uso de psicofármacos, presença de *deficit* neuromotor, patologia descompensada, história de cirurgia prévia e acompanhante não familiar.

A abordagem assumida permitiu uma amostra randomizada e nenhuma das crianças recebeu medicação ansiolítica pré-anestésica.

Aplicação da Escala, Pontuação e Valores de Cutoff

A mYPAS-SF foi aplicada em dois momentos: antes da entrada para o bloco (T1) e na sala de bloco operatória aquando da introdução da criança à máscara de anestesia com um membro da família a acompanhar a criança (T2). O único observador, vestido de modo idêntico aos restantes profissionais (médicos e enfermeiros), foi o autor principal do artigo, não tendo sido estabelecido qualquer contacto direto entre o mesmo e as crianças ou os pais. Antes do presente estudo, um ensaio piloto foi elaborado para propósitos de treino e aperfeiçoamento do uso da escala. Referente à pontuação, para cada domínio a pontuação parcial foi dividida pelo máximo passível de ser obtido nesse domínio (6 para vocalizações, 4 para os restantes). De seguida, realizou-se o somatório de todos os valores parciais, que foram divididos por 4 e multiplicados por 100 para criar a pontuação final (Tabela I do estudo). A escala apresenta valores de 22.92 até 100 com valores mais altos a indicar maiores estados de ansiedade.

O *cutoff* original de 30 foi utilizado como aconselhado pela investigadora Brooke N. Jenkins (revisora da escala) após conversação por *e-mail*. Assim, crianças com uma pontuação total superior a 30 foram consideradas como ansiosas enquanto pontuações entre 22.92 e 30 classificaram crianças como não ansiosas.

Recursos Humanos e Hospitalares

Deve ser relevado que os dias de colheita de dados são reservados para cirurgia pediátrica com profissionais de saúde (anestesistas, cirurgiões, enfermeiros) com experiência profissional pediátrica. No espaço da enfermaria, uma multiplicidade de brinquedos foram providenciados às crianças, juntamente com livros de colorir. Foi ainda permitido às crianças que transportassem consigo os seus aparelhos eletrónicos para jogos ou visualização de desenhos animados e clipes de vídeo. Durante as datas de colheita, esteve também presente uma monitora voluntária - educadora de infância reformada – que brincou e distraiu as crianças.

Abordagem Estatística

Os resultados foram apresentados sobre a forma de tabelas descritivas e valores <0.05 foram considerados como estatisticamente significativos. Os testes utlizados consistiram no teste de Mann-Whitney, Qui-Quadrado, McNemar e Teste T de Student.

Numa fase primordial, foram criados novos grupos tendo por base a divisão das crianças por variáveis: Grupo Etário 1 (<4anos) e Grupo Etário 2 (≥4anos) ; procedimento cirúrgico de otorrinolaringologia (ORL) e não-ORL; rapazes e raparigas; e ASA status 1 e ASA 2.

A análise descritiva foi realizada com recurso à média, mediana e desvio padrão das pontuações obtidas da escala, segregado para cada variável – idade, procedimento cirúrgico, sexo, ASA status. Quando apropriados, foram utilizados os testes de *Mann-Whitney* e T-teste de *Student* para o estudo de variáveis contínuas e os testes de X^2 e exato de *Fisher* para variáveis categóricas. Os testes de *McNemar* e *Kappa agreement* foram aplicados para analisar a distribuição do estado de ansiedade das crianças em T1 e T2.

Resultados

Análise Descritiva

Um total de 67 crianças foram incluídas no estudo de acordo com os critérios estipulados, sem *missing cases.* A média de idade dos 42 (62.7%) rapazes e das 25 (37.3%) raparigas foi de 4.2 ± 1.2 anos, com 30 (44.8%) das crianças a constituir o primeiro grupo etário (<4 anos). Na população estudada, observaram-se 56 (83.6%) casos com ASA *status* 1 e 35 (52.2%) de procedimentos de ORL.

Análise das Pontuações da mYPAS-SF

Os valores da mediana, percentis (25-75), média e desvio padrão da pontuação da escala nos tempos T1 e T2 encontram-se na Tabela I, onde também se relata a diferença destes valores entre o tempo T1 e T2, divididos pelas variáveis estudadas. A pontuação máxima de 100.00 foi registada por dois rapazes com uma resposta fisiológica com enurese, durante a indução anestésica (T2)

	Tempo 1	**Tempo 2**	**Tempo 2 – Tempo 1**
Mediana (25^{Th}-75^{th})	22.9 (22.9 - 27.1)	22.9 (22.9 - 35.4)	
Média ± DP	26.2 ± 7.2	33.6 ± 17.9	7.4 ± 14.7
Sexo			
Rapazes	25.7 ± 6.4	35.2 ± 19.1	9.5 ± 16.4
Raparigas	26.9 ± 8.5	30.9 ± 15.9	4.0 ± 10.6
ASA Physical Status			
1	26.3 ± 7.5	32.5 ± 17.0	6.2 ± 12.4
2	25.8 ± 6.3	39.4 ± 22.1	13.6 ± 23.0
Idade (anos)			
<4	25.6 ± 6.3	36.2 ± 17.5	10.6 ± 13.9
+4	26.6 ± 7.9	31.5 ± 18.2	4.9 ± 15.0
Cirurgia			
ORL	25.1 ± 6.1	33.9 ± 19.9	8.9 ± 17.4
Não ORL	27.4 ± 8.2	33.3 ± 15.9	5.9 ± 11.0

Tabela I - Mediana, percentis (25-75), média e desvio padrão das pontuações da mYPAS-SF no Tempo 1 e no Tempo 2.
ASA (American Society of Anesthesiologists physical status), ORL (Otorrinolaringologia).

Com recurso ao *cutoff* previamente definido, 6 crianças foram classificadas com ansiosas no T1 e 24 no tempo 2, com prevalências respetivas de 13,4% e 35,8%. A distribuição das crianças consideradas ansiosas, em ambos os momentos temporais, é apresentada na tabela II, de acordo com as variáveis do estudo.

	Ansiosos (Pontuação>30)						**Total**
	Tempo 1			**Tempo 2**			
	N	**%**	**P**	**N**	**%**	**p**	
Sexo			0.634			0.303	
Rapazes	5	11.9		17	40.5		42
Raparigas	4	16.0		7	25		25
Idade(anos)			0.458			0.95	
<4	3	10.0		14	46.7		30
+4	6	16.2		10	27.0		37
ASA Physical status			0.644			0.157	
1	8	14.3		18	32.1		56
2	1	9.1		6	54.5		11
Cirurgia			0.053			0.196	
ORL	2	5.7		10	26.8		35
Não-ORL	7	2..9		14	43.8		32

Tabela II - Distribuição das crianças ansiosas (pontuação >30) nos tempos 1 e 2, discriminada para cada variável. ASA (American Society of Anesthesiologists

physical status), ORL (Otorrinolaringologia).

Uma diferença estatisticamente significativa não foi encontrada entre o número de rapazes e raparigas ansiosos (p=0.634 para T1 e p=0.303 para T2). Contudo, demonstrou-se que os rapazes têm mais tendência a aumentar a ansiedade (pontuações mais elevadas) de T1 para T2, de um modo estatisticamente significativo (p=0.049), quando comparados com as raparigas. Não foram encontradas diferenças estatisticamente significativas entre o estado de ansiedade/pontuações da escala e o ASA (p=0.664 e p=0.157) e o tipo de procedimento cirúrgico (p=0.053 e p=0.196).

A distribuição das crianças ansiosas/não-ansiosas em T1 e T2 é descrita na tabela III. O valor de *cutoff* >30 foi novamente utilizado para definir a população ansiosa.

		Tempo 2 - Ansioso		**Total**
		Não	**Sim**	
Tempo 1 - Ansioso	**Non anxious**	40	18	58
	Anxious	3	6	9
Total		43	24	67

Tabela III - Distribuição das crianças em ansiosas ou não ansiosas no Tempo 1 e no Tempo 2.

Um total de 46 (68.7%) crianças manteve o seu estado (ansioso/não ansioso) de T1 para T2 (*McNemar* p=0.01). Contrariamente, um total de 21 (31.3%) crianças alteraram o seu estado com uma proporção de 18 (26.9%) das crianças a adquirirem um estado ansioso. O valor de *Kappa agreement* encontrado foi de 0.209 com um p=0.038.

Discussão

Como primeira observação, destaca-se uma anotação sobre a diferença percentual de sexo, com predomínio de rapazes (62.7%), na amostra randomizada que vai de encontro aos padrões de distribuição por sexo do CHP, após consulta da distribuição da faixa etária dos 2-6anos a ser submetida a cirurgia eletiva de ambulatório em condições de anestesia geral, neste intervalo temporal de 8 semanas, clarificando a ausência de um potencial viés.

Resultados Genéricos

Valores mundiais reportados de 60% de crianças a experienciar estados de ansiedade em contexto pré-operatório, motivam uma contraposição das prevalências encontradas no presente

estudo (13.4% para T1 e 35.8% para T2) com similares registadas noutros hospitais nacionais, mas até ao momento do estudo não estava disponível informação que viabilizasse essa comparação. Deste modo, movemos o foco para o plano do que seria expectável, tendo por base a logística, qualificações e recursos hospitalares. O contacto com profissionais especializados na área pediátrica, a ação da monitora, a miríade de equipamento e brinquedos disponíveis; e ainda a oportunidade de usarem aparelhos eletrónicos são fatores que, em estudos prévios, ajudaram a diminuir e a aliviar os níveis de ansiedade pediátricos em contexto pré-operatório. Este contacto com os recursos ocorre essencialmente no Tempo 1, com um menor número de crianças a transportar objetos deste conjunto para o Tempo 2. Esta observação, em paralelo com a tendência já verificada de aumento generalizado da ansiedade no momento de entrada na sala do bloco, pode surgir como uma explanação adicional para a prevalência aumentada em T2.

Interacção entre as variáveis

No que compete à diferença de sexos, o grupo dos rapazes apresentou pontuações mais altas em ambos os momentos, sendo que os rapazes tendem a obter pontuações mais elevadas, correspondentes a estados mais ansiosos, ainda que o número de rapazes ansiosos (acima do *cutoff*) não seja significativamente diferente do número de raparigas ansiosas. Estudos passados estabelecem um elo de ligação entre o sexo masculino e respostas mais ansiosas, enquanto publicações mais recentes não evidenciam o sexo como fator capaz de encerrar este tipo de distinção. Desta constatação decorre que estudos futuros, aprimorados com maior tamanho amostral, tenham não só propósito como relevância para originar resposta a estas observações.

Na ótica da distribuição das crianças ansiosas/não ansiosas (Tabela III), foi possível inferir que uma mudança do estado de ansiedade entre T1 e T2 não tende a acontecer na maioria das crianças. Não obstante, se esta alteração efetivamente se suceder tende a ser no sentido de conversão num estado ansioso. A tendência referente à alteração aliada a um estado mais ansioso em T2 vai de encontro ao encontrado pela literatura da área de conhecimento.

Atentando à distribuição por grupos etários, verificou-se uma tendência para as crianças mais jovens (<4 anos) obterem maiores pontuações, mesmo na ausência de uma diferença estatisticamente significativa. Mais uma vez, a associação de estados mais ansiosos a idades menores é relatada em estudos prévios, com particular veracidade na faixa etária em estudo.

Conclusões

Um ponto de relevo que merece distinção prende-se com a escassez de estudos exploratórios do nível de APPO a nível nacional. Um crescendo de interesse nesta área de conhecimento deve ser fomentado nos profissionais de saúde, com particular avivamento nas instituições de saúde com programas dedicados a cirurgia pediátrica. O desenvolvimento de novas escalas e revisão das pré-existentes aptas a medir os níveis de ansiedade providenciam terreno firme para a labutação de estratégias ansiolíticas mais detalhadas e adaptadas à população infantil.

Partindo da prevalência de crianças ansiosas constatada pelo estudo, uma revisão da metodologia e das *guidelines* aplicadas neste contexto hospitalar pode evidenciar-se como proveitosa. A proporção de crianças ansiosas encontra-se num limiar abaixo do relatado em termos mundiais refletindo não só o resultado de boas práticas, como o aproveitamento de todos os recursos disponíveis, do material (brinquedos, livros) à assistência na pessoa da monitora voluntária. De uma forma covalente, a prevalência verificada pode ser encolhida pela identificação de crianças com traços ansiosos intrínsecos com maior propensão para estados ansiosos no cenário discutido. Este grupo de crianças poderá usufruir de medicação anestésica ansiolítica que, apesar de não desprovida de efeitos negativos, se tem evidenciado como valorosa em casos selecionados.

Detalhando na intenção de distração das crianças, atividades contextualizadas e com adequação ao desenvolvimento da criança, tais como contar histórias ou colorir desenhos, ilustraram-se recentemente como alternativas eficientes à terapêutica farmacológica tradicional. Atividades desta índole devem, assim, ser encorajadas e facilitadas, especialmente na presença de pessoal capacitado para o efeito, tal como monitores e voluntários.

Em adição, um conjunto de intervenções, especialmente com acompanhamento psicológico, mostrou-se frutífero ao diminuir os níveis de ansiedade e aumentar a cooperação das crianças durante o momento da indução anestésica. Em paralelo, a implementação de programas comportamentais revelou potenciais proveitos semelhantes, apesar de estudos reportarem alguns resultados contraditórios e elevados custos associados a este tipo de medidas.

A presença parental durante a indução anestésica tem sido um tema de intenso debate, num contexto recente de publicação, após ter sido comprovado que o estado de ansiedade dos pais exerce influência sobre o estado de ansiedade das crianças. A presença parental mostrou reduções no nível de ansiedade e um aumento generalizado da satisfação com a prestação de cuidados de saúde, contudo apenas os pais calmos parecem reter um efeito ansiolítico sobre crianças ansiosas.

Dado o contexto reportado ao longo do estudo, uma indicação para um caminho futuro materializa-se na sugestão de implementação de estudos similares a larga escala, num panorama nacional, com estudo de uma amostra consideravelmente maior e análise de potenciais variáveis que predispõem e contribuem para a construção de estados ansiosos. Atenção particular deve ser dada na incorporação da família no processo com garantia de uma atuação coesa e sinérgica com a equipa de profissionais de saúde – que desempenham um papel basilar e permanente -, promovendo assim uma experiência peri operatória positiva. A avaliação psicológica compreensiva afigura-se como um marco capital para uma subsequente elucidação deste tópico a par do desenvolvimento de programas de cariz ansiolítico cada vez mais individualizados. O futuro prende-se com a elaboração destes programas, detalhados e aprofundados, com combinações multimodais de diferentes abordagens minimizadoras de ansiedade como a presença parental durante a indução, a terapia farmacológica, as atividades de distração e os programas de intervenção comportamental e de informação pré-operatória.

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ANEXOS

ANEXO 1 – Modified Yale Preoperative Anxiety Scale

Scale & Data

Nr Processo:_____ ***ASA***: _____

Data de Nascimento: _____ ***Cirurgia***:_____

Sexo: ♂ / ♀

Time 1

Activities

1. The child looks around, is curious, plays with toys, reads (or other behavior appropriate for the age Group); moves around the preanesthetic/treatment room to get toys or seeking family members; might move towards the equipment in the surgery room;
2. The child does not explore or play, may look down, plays with own hands or sucks its thumb (blanket); may sit close to family members while it is playing, or may show a manic quality while playing;
3. The child moves without concentration from the toy to family members, movements are not connected to the activity; movements or play is frantic/agitated; twisting, moving on the table; may push the mask or grab family members;
4. Tries to escape, pushes with feet and arms, may move its entire body; in the waiting-room, runs around without purpose, does not look at the toys, does not want to be apart from family members, clings on desperately.

Vocalization

1. Reads (vocalization not adequate for the activity), asks questions, makes comments, stutters, laughs, answers questions promptly, but is usually quiet; child is too young to speak in social situations or too absorbed in the play to answer;
2. Answers to adults but whispers, "baby talk", only shakes its head;
3. Quiet, no sound or does not answer to adults;
4. Weeping, moaning, grunting, silent cry;
5. Child is crying, or might yell "no";
6. Crying, high pitched and sustained cry.

Expressing emotions

1. Happy, smiling, or concentrated on the play;
2. Neutral, no discernible face expression;
3. From worried (sad) to frightened, sad, worried, or teary eyes;
4. Distressed, crying, uncontrolled, eyes might be wide opened.

State of arousal

1. Alert, looks around occasionally, notices or follows anesthesiologist's actions (might be relaxed);
2. Withdrawn, calm and silent, might suck its thumb, or its face might be like an adult's face;
3. Attentive, looks around quickly, might be startled by noises, eyes wide opened, body is tense;
4. Whines in panic, might cry or shun others, turns body around.

Time 2

Activities

1. The child looks around, is curious, plays with toys, reads (or other behavior appropriate for the age Group); moves around the preanesthetic/treatment room to get toys or seeking family members; might move towards the equipment in the surgery room;
2. The child does not explore or play, may look down, plays with own hands or sucks its thumb (blanket); may sit close to family members while it is playing, or may show a manic quality while playing;
3. The child moves without concentration from the toy to family members, movements are not connected to the activity; movements or play is frantic/agitated; twisting, moving on the table; may push the mask or grab family members;
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